Overcoming the Phase Height Limit Associated with Transistor Photofabrication by Utilizing Piezo-Active Semiconductors and Coulomb Force Lines for Transistor Sizes of Around 1nm

11 November 2022

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Introduction

To understand the path forward for further traditional transistor miniaturization, one needs to understand the underlying mechanism through which photofabrication has proven an effective means of assembling functional semiconductor elements and the nature of photofabrication's limitations.

Abstract

Photo-assembly of a transistor is made possible by doping a non-conductive (usually silicon) wafer with a certain concentration of semiconductor material and using light to carry electrical and by extension, magnetic charge to the metals. Once charged, the magnetic force exerted by a handful of metallic atoms causes the coalescence of those atoms into slightly oblong formations of the metals that function as transistors. Although some heat is generated in this process, heat is not the mode of actuation of the materials. This is a process that relies upon light as a means of magnetizing small sections of a doped wafer to bring about a coalescence of materials.

Ultraviolet light of a 325nm wavelength has a phase height of around 6.5nm and this sets the lower bound of size possible for a light-driven fabrication method. Although there is no limit to the precision with which a focal plane can be set using modern methods, the phase height of a single photon is a barrier that cannot be overcome by further focusing of light. The entire area within that phase height is subjected to transference of energy and thus, striking a wafer with a perfectly focused beam with a 6.5nm phase height will give you a 6.5nm transistor.

Although it is possible to produce, under extremely cold conditions and under certain other circumstances, light without a property of phase (solitonized light,) this light would exert no magnetism and thus would work against the goal of magnetic coalescence of a transistor.

In order to achieve the task of delivering electromagnetic energy to hyperconfined areas, I propose a new approach that calls for combining semiconductor materials structured to have piezoelectric properties in addition to their semiconductive property. Such a hybrid molecule, when influenced by a Coulomb Force Line, would experience tugging in a single direction. Any tugging, shearing, pushing, or torsion of one half of the molecule with relation to the other would result in the generation of electricity and thus magnetism of internal origin. This force would be cumulative and thus could be "slowly" introduced over a period of a few seconds of contact with a Coulomb Force Carrier Die (CFCD.) Such a mechanism could exert

force over a distance of about one hundred atomic widths.

The Coulomb Force Line would not exert undesired electromagnetic or mechanical influence on any area other than the area currently under construction; a common source of fault in photofabrication that forces the scrapping of many chips.

An array of aligned electrons based in crystals can be used as the die from which each layer of a modern three-dimensional microprocessor may be constructed. The dies would be tailored to match the circuit diagram desired for each layer of the chip. If, for instance, there are five distinct functional flat layers in a chip design, five distinct dies would be utilized to generate the formation of transistors that match the design schematic for each layer. The assembly line would ferry each chip from one die to the next, each chip coming into brief contact with the dies in the appropriate sequence until all layers are completed.

The Coulomb Force Lines would be varied rapidly in their effective intensity by simply passing electricity in a perpendicular direction over the far side of the die, increasing the repulsive force of the overall line when the electrons associated with that electrical flow perchance align with the fixed structures below. Even slight modulations to static lines of force would be enough to prompt the piezoelectric effect in such structures. Rather than attempting to "transmit" electrical energy to a specific point, an intrinsically sloppy process (in relative terms) given the tendency of light to scatter and its phase height, this method, profoundly, transmits no free-flying electromagnetism and instead relies upon Coulomb Force to coax molecules into internally generating their own attractive magnetic field. This is the only way to substantially bypass the present limitations of photofabrication within the context of traditional processors. Although a 3nm process based upon the emission of brief half-wavelength pulses (i.e. the current TSMC method) is technically another such method, 3.25nm is the absolute limit of their photofabricative approach

That said, one would still need to build the dies to facilitate such a process. I would suggest that the construction of crystals with such a specific structure can be achieved, ironically, through a "negative" photofabricative approach within a traditional autoclave. Crystalline deposits can be prevented from accumulating in all areas where a transistor is NOT desired using focused light to repel material that attempts to settle in those areas during synthesis. If the object is, for the purposes of die manufacture, to have 1nm "transistors" each spaced at least as far apart as a phase height of a photon (already a requirement for processor stability,) then it is possible to build such a crystalline die by shining highly focused light upon all areas in which one does not wish for crystals to accumulate. This leads to a stalactitic accumulation of 1nm-width formations within the autoclave with deep gorges between them.

Conclusion

This approach would certainly enable the manufacture of traditional transistors that are far smaller than currently possible and may even imply a faster manufacturing process than currently possible for photo-fabricated

chips.

Note: This method is outmoded by the method proposed in 9 January 2024 despite being superior to other extant methods. The basic concept of utilizing Coulomb Force Lines coupled with a piezoelectric property of a molecule may have other unexplored applications including the transfer of small amounts of electrical energy without signal leakage, for example.